Obstacle negotiation and dual-tasking in people with a unilateral transtibial amputation.

Background: Falls in people with a lower limb amputation (PLLAs) are common and most often occur while walking, resulting in physical and psychological consequences that adversely affect quality of life. Walking is a complex motor task requiring cognitive resources. Due to walking with a prosthesis, PLLAs report focussing on every step they take, indicating greater cognitive needs. However, cognitive resources are limited, and most of our everyday activities also involve the simultaneous performance of motor and cognitive tasks, known as dual-tasking. The inter-relationship between mobility, cognition and postural stability in PLLAs using a prosthesis is just starting to be understood.

Objective: To determine the effect of dual-tasking on gait in the complex activity of obstacle clearance.

Proposed Methods: People with a unilateral transtibial amputation will be recruited from an outpatient clinic. Participants will complete a series of dual-task tests (e.g., counting backwards by 3s, holding a cup of water) while walking a straight path (6 m) with and without having to step over an obstacle. The obstacle will be set to the average height of a raised sidewalk (0.15 m). Spatial-temporal gait parameters (velocity, cadence, and stride time) will be recorded using a Zeno™ walkway (ProtoKinetics, Havertown, PA).

Future Applications: The ability for PLLAs to dual-task while also successfully negotiating obstacles is critical for safe community ambulation. New clinical markers of instability based on ecologically valid tests may enable clinicians to accurately assess and identify PLLAs at an elevated risk for future falls.